

PATENT

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APPLICANT: RICHARD LEACH TAGG      ART UNIT: 3671  
SERIAL NO.: 09/724,284      EXAMINER: RAYMOND W. ADDIE  
FILED: NOVEMBER 28, 2000      CONFIRMATION NO.: 7550  
TITLE: MODULAR BARRIER

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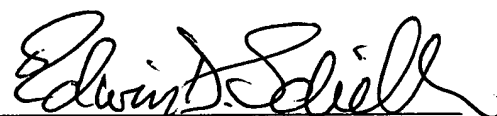
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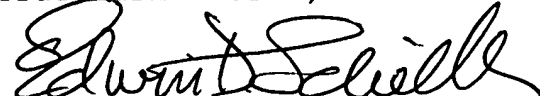
Respectfully submitted,

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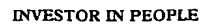
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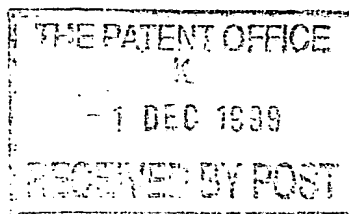


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1. Your reference

P71414.GB

2. Patent application number

(The Patent Office will fill in this part)

9928282.4

01 DEC 1999

3. Full name, address and postcode of the or of each applicant (underline all surnames)

RICHARD LEACH TAGG  
RINGSBALL HOUSE  
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UNITED KINGDOM

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

UNITED KINGDOM

00241448001

4. Title of the invention

MODULAR BARRIER

5. Name of your agent (if you have one)

TUNSTALL, CHRISTOPHER STEPHEN

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

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6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

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Date of filing  
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7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

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8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

NO

- a) any applicant named in part 3 is not an inventor, or
  - b) there is an inventor who is not named as an applicant, or
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Priority documents

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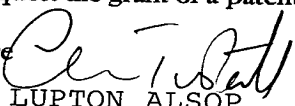
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11. I/We request the grant of a patent on the basis of this application.

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| Signature         |  | Date     |
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TUNSTALL, CHRISTOPHER STEPHEN  
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MODULAR BARRIER

BACKGROUND TO THE INVENTION

This invention relates to modular barriers of the type  
5 used in crowd and traffic control.

Conventional modular traffic control barriers consist of  
a number of barrier sections made from cast concrete.  
Each barrier section has a comparatively wide base  
10 portion surmounted by a comparatively narrow upright  
portion. Metallic ties are cast into the concrete and  
project from both ends of the upright portion of the  
barrier section. When two barrier sections are placed  
side-by-side, the metallic ties line up and can be  
15 bolted through, thus attaching the barrier sections to  
one another and at the same time forming a makeshift  
hinge. By means of the hinge, the two barrier sections  
can be articulated relative to one another, allowing the  
completed barrier to follow a serpentine path if desired.

20

Because the base portions of the barrier sections are  
comparatively wide as compared with the upright portions,  
the hinge-point at which the metallic ties are bolted to  
one another is spaced some distance away from the ends of  
25 the barrier sections. This is to allow a reasonable  
degree of angular movement between adjacent barrier  
sections, but means that the ends of the barrier sections  
cannot lie flush. It also means that as the adjacent  
barrier sections deviate more from being directly in  
30 line, a gap opens up between the edges of the base  
portions that lie towards the outside of the bend that

the barrier is following. This opening can act as a wheel trap for unwary motorists. The same problem exists with barriers used for crowd control, except the gap is a tripping hazard.

5

#### SUMMARY OF THE INVENTION

The present invention is designed to address this problem with conventional modular barriers. In common with conventional modular barriers, the modular barrier is formed from barrier sections. According to the present invention, a barrier section comprises a comparatively narrow upright portion having one or more projections at each end and a comparatively wide base portion including, at a female end of the barrier section, a nose having a surface that is a surface of rotation of the profile of the base portion and, at a male end, a correspondingly shaped cavity, in which, when the female end of the section is brought up to a male end of another such section, the projections mate with one another, allowing a hinge pin to be passed through them to articulate the sections together and the nose is accommodated in the cavity to prevent any gaps from opening up between the base portions of the two barrier sections as they are so articulated.

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Because the nose is a surface of rotation and the cavity is correspondingly shaped, the joint between the two base portions of adjacent barrier sections presents an essentially smooth profile irrespective of the angle between the two. No gaps are opened up as the nose rotates within the cavity. Eventually, the base portion

30



of the barrier section with a female end will impinge on the edge of the cavity in the base portion of the barrier section with a male end, thus preventing further movement, but on the other side, the exposed section of the nose presents an essentially smooth transition from the base portion of one barrier section to the base portion of the other.

Returning to the case of traffic control, as described above, the need to hinge the barrier sections of the conventional sort away from the ends of the upright portions causes spaces between adjacent barrier sections. These can be a problem when the barriers are used for contra-flow systems at night: oncoming vehicles' lights can dazzle if they shine through these gaps. For this reason, it is preferred in the barrier section of the present invention that, for each projection, a corresponding recess is provided on the other end of the barrier section. As the projections of one barrier section will fit within the recesses in another, the gap between the two can be substantially closed. Taking this idea further, each projection may be given a surface that is a surface of rotation, for example substantially part-cylindrical. The respective corresponding recesses may then be correspondingly shaped. This arrangement ensures that no gaps open up between the upright portions as the barrier sections articulate relative to one another, just as the nose and cavity do for the base. The net result is of a tight-fitting hinge.

30

As with most hinges, each projection on a barrier section

may be provided with a bore so that, when the female end of the section is brought up to a male end of another such section so that the nose is accommodated in the cavity, the bores in the projections line up allowing a hinge pin to be passed through them to articulate the sections together. Further rigidity can be imparted to the hinge if the nose also includes a bore, allowing the hinge pin to pass through it.

When a plurality of barrier sections according to the invention and hinge pins are assembled into a modular barrier, the projections on a female end of a first barrier section mate with the projections on a male end of another barrier section and a hinge pin passes through them and through the nose of the first barrier section, to articulate the sections together.

To secure the hinge pin in place, it may have a male thread that engages with a female thread in a dome-shaped cap, the nose of the first barrier section having a dome-shaped recess to accommodate the cap. The dome-shaped cap can be bolted down to the ground before the barrier is erected. The cap and the recess are dome-shaped so that, although the spacing between adjacent caps is critical, their relative orientation is not, making their installation a much simpler proposition.

Further strength can be imparted to the assembled barrier if the barrier sections are also held together by tension straps that encircle adjacent barrier sections, crossing from one side of the barrier to the other between the

barrier sections. These can spread impact forces across a number of adjacent barriers. For ease of installation of the straps, the upright portion of each barrier section may be provided with grooves to accommodate them.

5

Male and female end pieces can be used to complete the barrier. One or more openings in the side of the upright portions may be used to accommodate indicia such as reflective arrows or speed limit signs etc.

10

In another embodiment of the present invention, a modular barrier is assembled from barrier sections that are not substantially identical. In that case, the modular barrier includes a plurality of barrier sections, each comprising a comparatively narrow upright portion having one or more projections at each end, and a comparatively wide base portion including, at a female end of the barrier section, a nose having a surface that is a surface of rotation and, at a male end, a cavity having a surface that is a surface of rotation, in which for each such section there exists another section such that when the female end of the section is brought up to the male end of that other section, the projections mate with one another, allowing a hinge pin to be passed through them to articulate the sections together and the nose is accommodated in the cavity to prevent any gaps from opening up between the base portions of the two barrier sections as they are articulated relative to one another about the hinge pin. Of course, the barrier sections may be substantially identical.

30

### BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described by way of example with reference to the accompanying drawings in which:

- 5        FIG. 1 is a side view of a barrier section, showing the female end on the left and the male end on the right;  
         FIG. 2 is an end view of the female end;  
         FIG. 3 is a plan view;  
         FIG. 4 is an underneath view;  
10       FIG. 5 shows a female end piece;  
         FIG. 6 shows a male end piece;  
         FIG. 7 shows an alternative form of hinge pin; and  
         FIGs. 8 and 9 show an assembled barrier.

### 15       DETAILED DESCRIPTION OF THE INVENTION

- FIGs. 1 and 2 show a barrier section 10 that is formed by rotation moulding from high density polyethylene. Because the barrier section is rotation moulded, it is hollow and can be filled with water when in use for traffic control.  
20       To that end it is provided with a filling port and a drain plug (not shown). The barrier section includes a comparatively wide base portion 12 surmounted by a comparatively narrow upright portion 14. The upright portion has a first projection 16 at a male end of the  
25       barrier section and a second projection 18 at the female end. As is more clearly shown in FIG. 3, when considered in conjunction with FIGs. 1 and 2, both projections have substantially semi-cylindrical outer surfaces. The first projection 16 is designed to fit into a correspondingly  
30       shaped first recess 20 that lies below the second projection 18 of a similar barrier section. The second

projection 18 is designed to fit into a correspondingly shaped second recess 22 that lies above the first projection 16 of the similar barrier section. As can again be seen from FIG. 3, when considered in conjunction with FIGs. 1 and 2, the second recess 22 includes a part-cylindrical surface 24. The same is true of the first recess 20 and surface 26.

At the female end, the base portion 12 includes a nose 28. The surface of the nose is a surface of rotation of the profile of the base portion 12. At the male end, the base portion 12 includes a correspondingly shaped cavity 30, better illustrated in FIG. 4. The first and second projections 16, 18 are provided with bores 32, 34 and the nose 28 is also provided with a bore 36. The nose also includes an inverted dome-shaped or part-spherical recess 38 that will be described later.

When the female end of the barrier section 10 is brought up to a male end of a similar section, the projections mate with one another. The first projection 16 is received in the first recess 20 below the second projection 18 of the similar section. The second projection 18 of the similar section is received in the second recess 22 above the first projection 16. The corresponding substantially part-cylindrical surfaces of the projections 16, 18 and recesses 20, 22 are in close proximity to one another. The nose 28 is received in the cavity 30 of the similar section, again with their surfaces in close proximity. A hinge pin (not shown) may then be passed through the bores 32, 34, 36, in that

order, and screwed down or otherwise fixed into a dome-shaped cap (not shown) that sits within the recess 38 in the nose 28. The pin may be made from plastics, e.g. nylon, or a metal such as steel. The pin head may have a socket to receive a warning lantern.

By means of this device, one barrier section 10 can be articulated to the next. As will be appreciated, because the nose 28 is a surface of rotation and the cavity 30 is correspondingly shaped, the joint between the two base portions 12 of adjacent barrier sections 10 presents an essentially smooth profile irrespective of the angle between the two. Movement is eventually restricted by the base portion 12 of one barrier section 10 impinging on the edge of the cavity 30 in the base portion of the other barrier section 10. However, on the other side, the exposed section of the nose 28 forms an essentially smooth arcuate transition from the base portion 12 of one barrier section 10 to the base portion 12 of the other. Similarly, as the projections 16, 18 of one barrier section 10 fit within the recesses 20, 22 in the other and vice versa, the gap between the two is substantially closed. Again, the semi-cylindrical surfaces of the projections 16, 18 and recesses 20, 22 ensure that no gaps open up between the upright portions 14 as the barrier sections 10 articulate relative to one another, just as the nose 28 and cavity 30 do for the base 12. The net result is of a tight-fitting hinge and this helps to prevent a driver being dazzled by oncoming vehicles' lights, especially where the barrier is used in a contra-flow system at night.

As stated above, the hinge pin may have a male thread that engages with a female thread in a dome-shaped cap, the nose of the first barrier section having a dome-shaped recess to accommodate the cap. Alternatively, as shown in FIG. 7, the hinge pin 40 may have a bayonet fitting 42 that slots into appropriate bayonet grooves 44 in the cap 46. In this case, the cap 46 may be formed of a flat disc 48 surmounted by a slotted tube 50. The attachment of the tube 50 to the disc 48 is reinforced by webs 52. A warning light is shown at 53. The cap 46 may be made of plastics, such as nylon, or metal, such as steel or cast iron. It may be fixed in place by a spike on its lower surface and/or bolted down to the ground with shock bolts through three or four countersunk holes 54 before the barrier is erected. Alternatively, it may be left loose or otherwise secured. Because the caps 46 are dome-shaped, or at least circular when viewed from above, they need only be secured at predetermined centres; their relative orientation is not critical, making their installation a much simpler proposition.

As can be seen from FIG. 1, each barrier section 10 includes one or more openings 56 in the side that may be used to accommodate indicia such as reflective arrows or speed limit signs, etc. Furthermore, a pair of grooves 58 run along each side and continue around the recesses 20, 22 to join identical grooves on the other side of the barrier section 10. Adjacent barrier sections can be held in place by tension straps (not shown) that encircle them, located within the grooves 58, crossing from one

side of the barrier to the other between the barrier sections 10, somewhat in the form of a figure-of-eight, or a number of superposed figures-of-eight. A suitable material would be 75mm by 6mm polypropylene straps. The tension straps may be installed relatively loosely and, once in place, tightened by a ratchet mechanism. The tension straps spread impact forces across a number of adjacent barrier sections 10, better dissipating the impact. A further impact absorbing addition (not shown) would be an inverted U-shaped moulding, filled with cushioning plastics material, foam for example, that is slotted over the tops of the barrier sections. It may be designed to be sacrificial, bursting or tearing on impact for example.

Male and female end pieces 60, 62 are shown in FIGs. 5 and 6. As can be appreciated, these are fixed to the free ends of the terminal barrier sections 10 once the barrier has been erected, to complete the barrier. They are attached to respective barrier sections in exactly the same way as the barrier sections are attached to one another. The fully assembled barrier is shown in FIGs. 8 and 9. As FIG. 9 clearly demonstrates, the gaps from which conventional barriers suffer are absent from the present invention, which present an essentially smooth continuous base.

Whilst the present invention has been described in connection with a unitary barrier section, other arrangements are possible. One example would be a barrier section in which the nose is a separate item, in the form



of an enlarged version of the dome-shaped cap described, obviating the separate cap. Both ends of the two barrier sections will then be provided with recesses that accommodate different parts of the nose. If one regards  
5 this nose as belonging to one of the barrier sections, and term that its female end, then that barrier section possesses a nose having a surface that is a surface of rotation of the profile of the base portion, as described above.

CLAIMS

1. A barrier section comprising:  
a comparatively narrow upright portion having one or  
5 more projections at each end; and  
a comparatively wide base portion including, at a  
female end of the barrier section, a nose having a  
surface that is a surface of rotation of the profile of  
the base portion and, at a male end, a correspondingly  
10 shaped cavity;  
in which, when the female end of the section is  
brought up to a male end of another such section, the  
projections mate with one another, allowing a hinge pin  
to be passed through them to articulate the sections  
15 together and the nose is accommodated in the cavity to  
prevent any gaps from opening up between the base  
portions of the two barrier sections as they are so  
articulated.
- 20 2. A barrier section according to claim 1 in which, for  
each projection, a corresponding recess is provided on  
the other end of the barrier section.
3. A barrier section according to claim 2 in which each  
25 projection has a surface that is a surface of rotation  
and the corresponding recess is correspondingly shaped.
4. A barrier section according to claim 3 in which the  
surface of rotation of each projection is substantially  
30 part-cylindrical.

5. A barrier section according to any preceding claim in which each projection is provided with a bore and, when the female end of the section is brought up to a male end of another such section so that the nose is accommodated in the cavity, the bores in the projections line up allowing a hinge pin to be passed through them to articulate the sections together.
6. A barrier section according to claim 5 in which the nose also includes a bore, allowing the hinge pin to pass through it.
7. A barrier section according to any preceding claim having one or more openings in the side of the upright portion.
8. A modular barrier comprising a plurality of barrier sections according to any one of claims 1-7 and hinge pins, in which the projections on a female end of a first barrier section mate with the projections on a male end of another barrier section and a hinge pin passes through them and through the nose of the first barrier section, to articulate the sections together.
9. A modular barrier according to claim 8 in which the hinge pin has a male thread that engages with a female thread in a dome-shaped cap, the nose of the first barrier section having a dome-shaped recess to accommodate the cap.
10. A modular barrier according to claim 8 or claim 9 in

which the barrier sections are also held together by tension straps that encircle adjacent barrier sections, crossing from one side of the barrier to the other between the barrier sections.

5

11. A modular barrier according to claim 10 in which the upright portion of each barrier section is provided with grooves to accommodate the tension straps.

10

12. A modular barrier according to any one of claims 8-11 further comprising male and female end pieces.

13. A modular barrier including a plurality of barrier sections, each comprising:

15

a comparatively narrow upright portion having one or more projections at each end; and

a comparatively wide base portion including, at a female end of the barrier section, a nose having a surface that is a surface of rotation and, at a male end,

20

a cavity having a surface that is a surface of rotation;

in which for each such section there exists another section such that when the female end of the section is brought up to the male end of that other section, the projections mate with one another, allowing a hinge pin to be passed through them to articulate the sections together and the nose is accommodated in the cavity to prevent any gaps from opening up between the base portions of the two barrier sections as they are articulated relative to one another about the hinge pin.

30

14. A modular barrier according to claim 13 in which the

barrier sections are substantially identical.

15. A modular barrier according to claim 14 in which the barrier sections are in accordance with any one of claims

5 1-7.

16. A barrier section substantially as described herein with reference to and/or as illustrated in FIGs. ??? of the accompanying drawings.

10

17. A barrier section substantially as described herein with reference to and/or as illustrated in FIGs. ??? of the accompanying drawings.

ABSTRACTMODULAR BARRIER

5 A modular barrier consists of a plurality of identical barrier sections. Each section 10 includes a base portion 12 surmounted by an upright portion 14. The upright portion has projections 16, 18 with substantially semi-cylindrical outer surfaces at its ends. Correspondingly  
10 shaped recesses 20, 22 are also provided. At a female end, the base portion 12 includes a nose 28. The surface of the nose is a surface of rotation of the profile of the base portion 12. At the male end, the base portion 12 includes a correspondingly shaped cavity 30. The first  
15 and second projections 16, 18 and nose 28 are provided with bores 32, 34, 36. When the female end of the barrier section 10 is brought up to a male end of a similar section, the projections mate with one another and the nose 28 is received in the cavity 30 of the similar  
20 section. A hinge pin (not shown) may then be passed through the bores 32, 34, 36. By means of this device, one barrier section can be articulated to the next and the joint between the two base portions of adjacent barrier sections presents an essentially smooth profile  
25 irrespective of the angle between the two.

(FIG. 1)

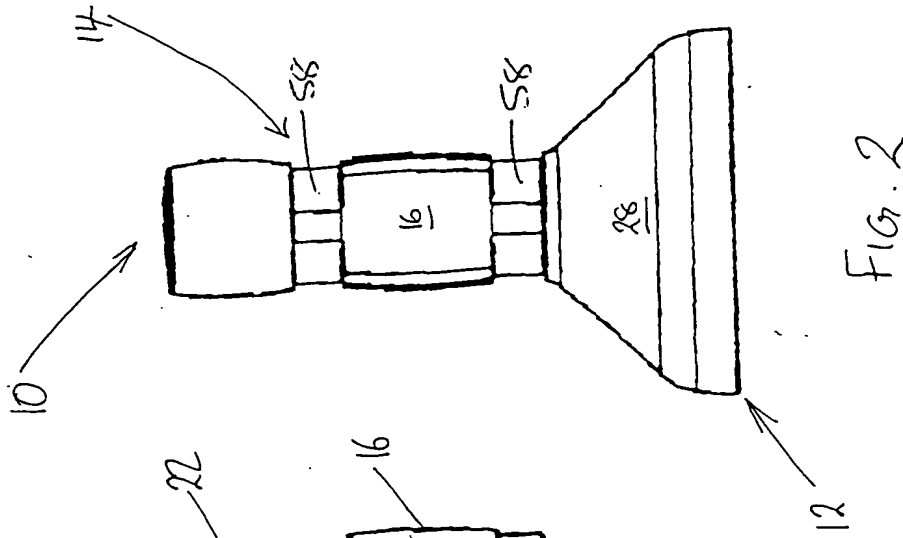


FIG. 2

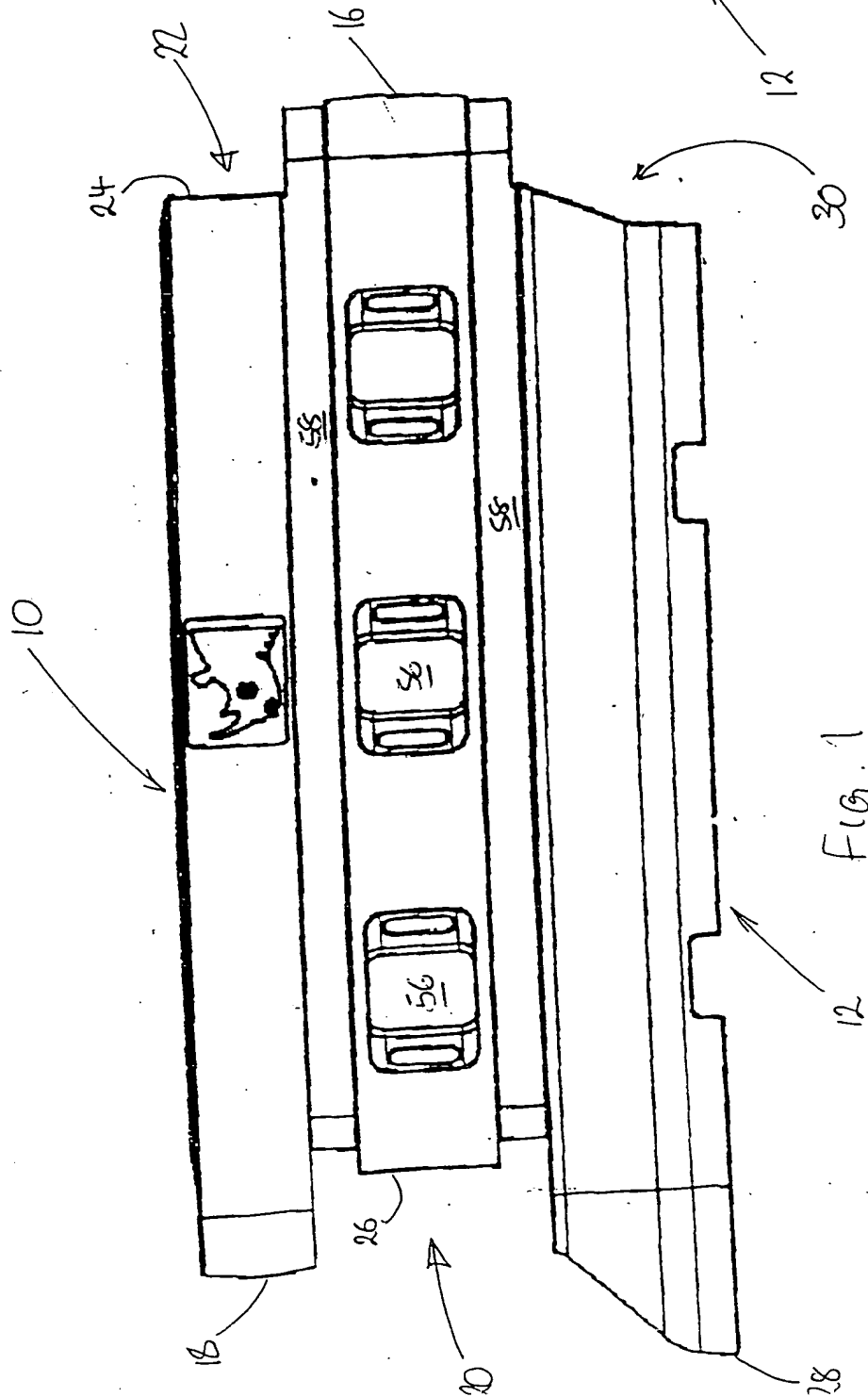


FIG. 1

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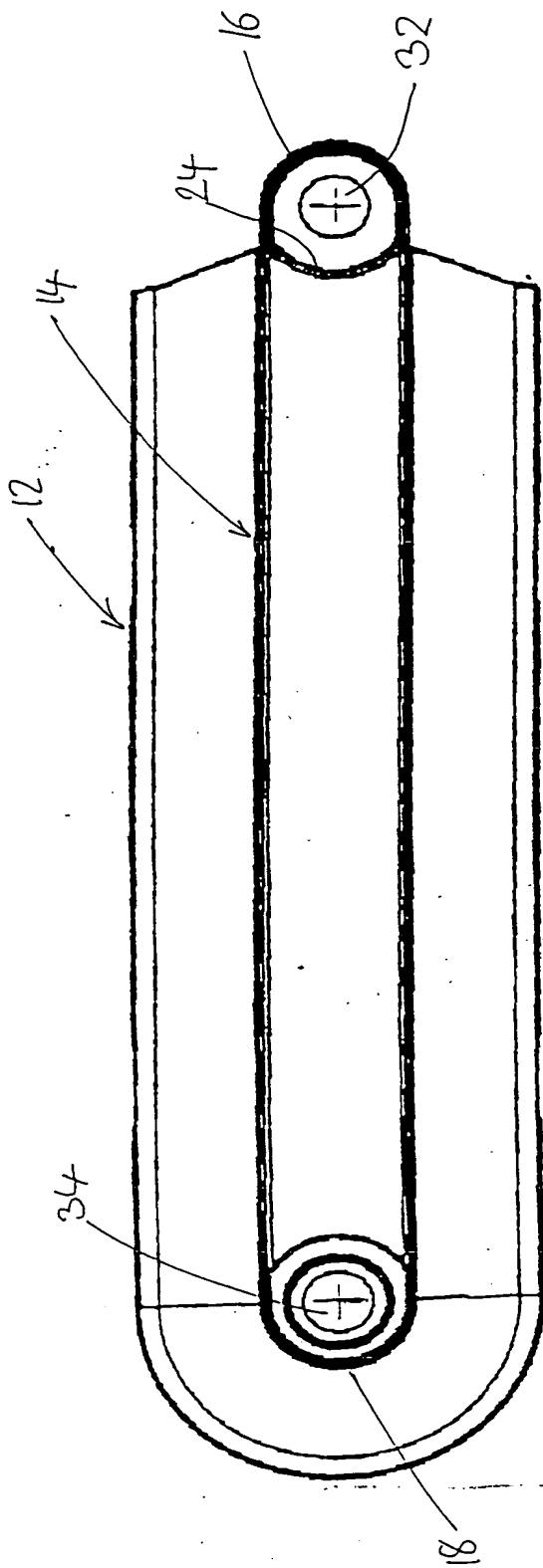


FIG. 3

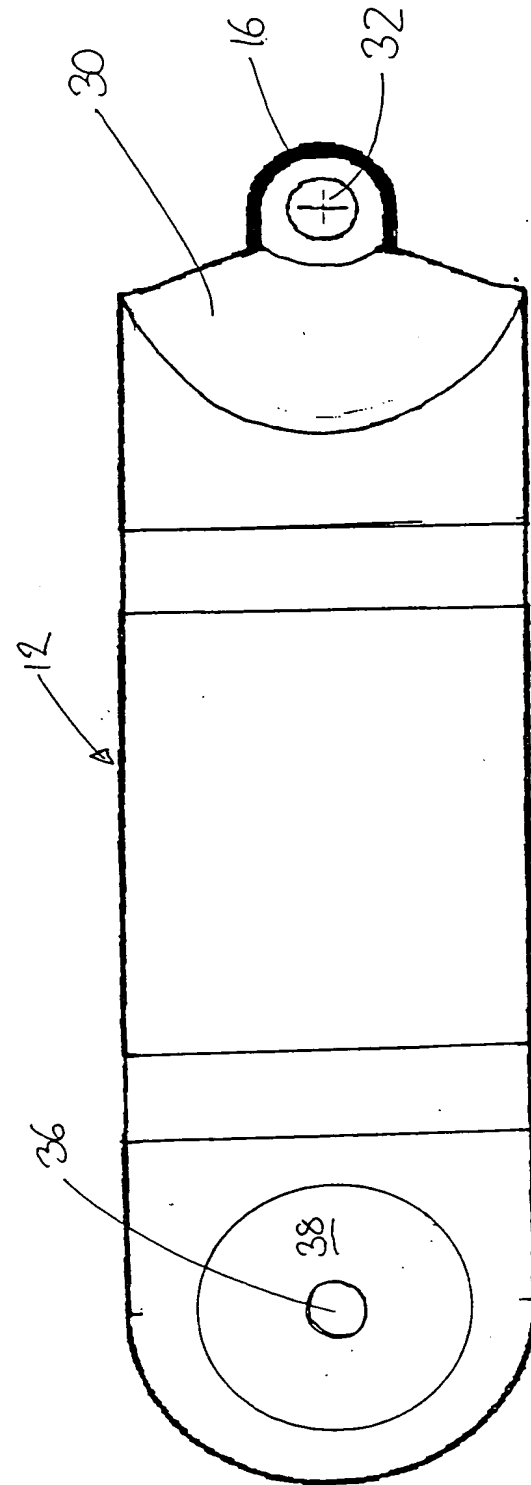


FIG. 4

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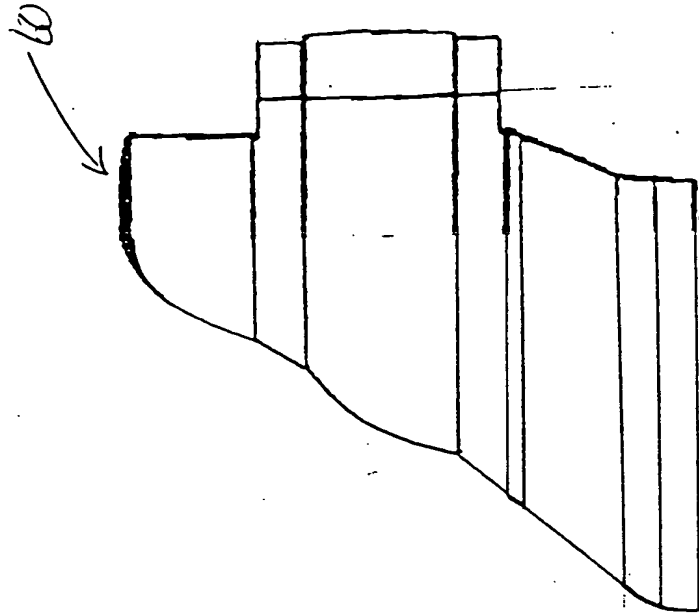


FIG. 6

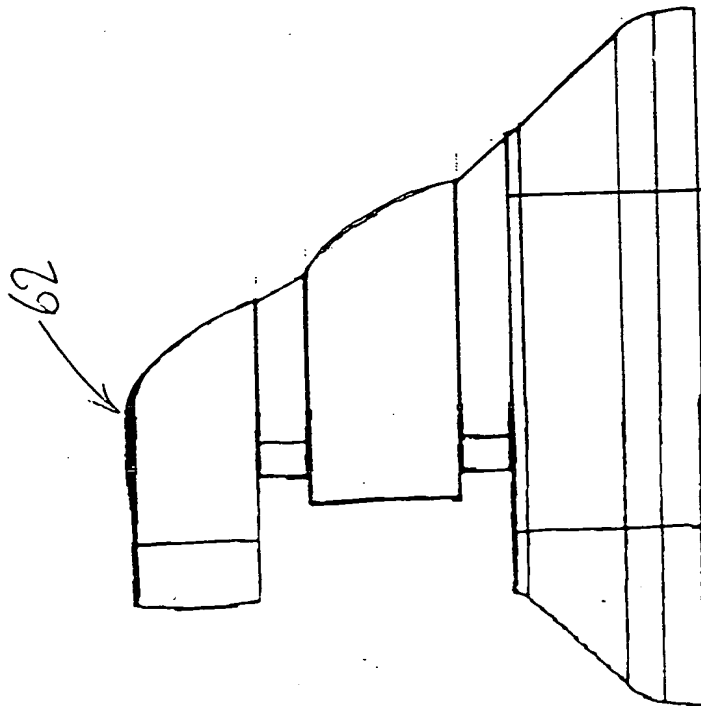
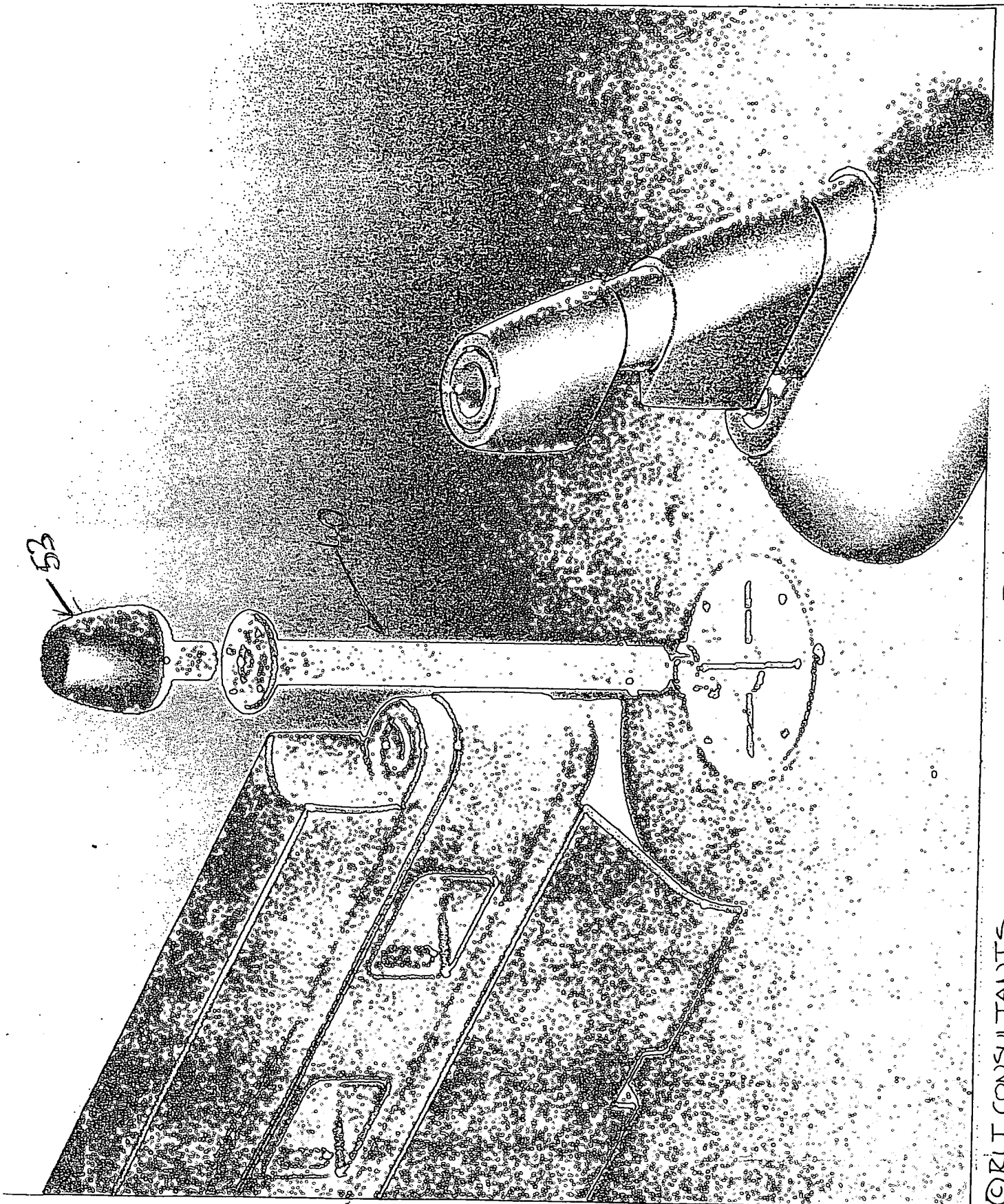


FIG. 5

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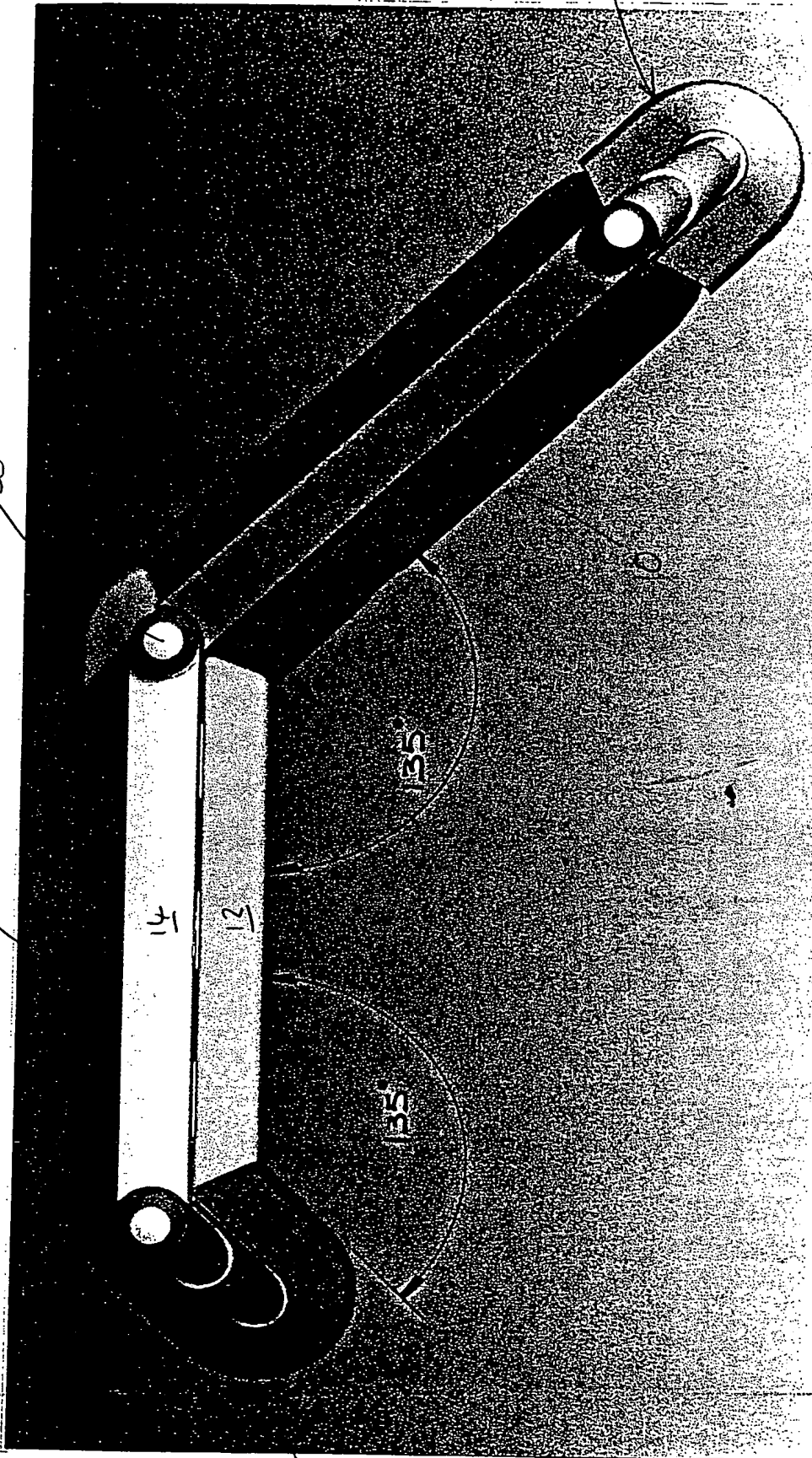


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FIG. 7

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Fig. 8

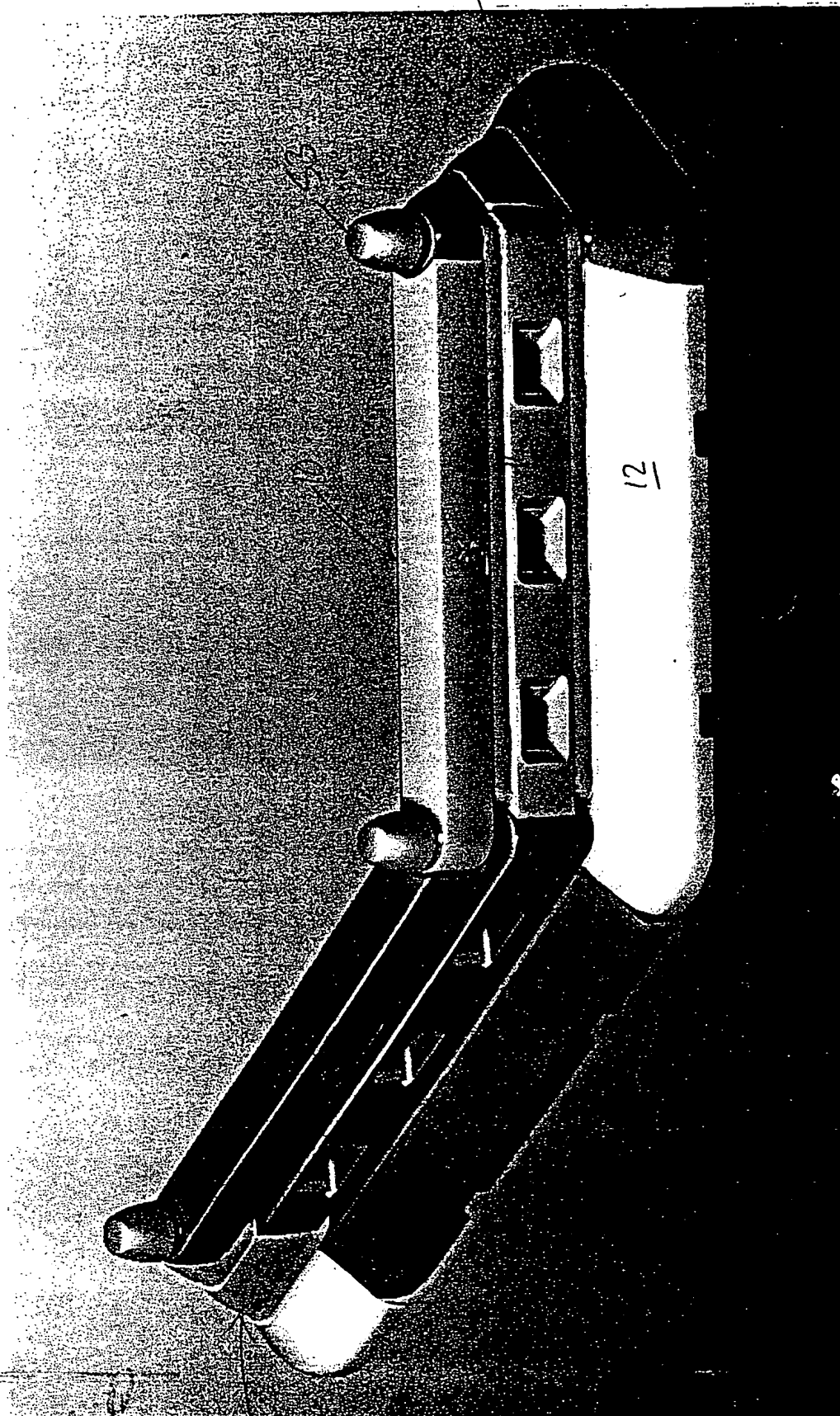


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FIG. 9.



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